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ABSTRACT

This research focuses on a major characteristic of mass-education: the requirement that each child in the classroom perform the same learning tasks at the same time. Little is known about consequences of such instructional uniformity on learning, emotional growth and interpersonal relations. Three basic experiments were conducted. The first study varied the amount of information available to 12 groups each consisting of 5 3rd-grade girls who were performing identical tasks; significantly more comparison behavior was found in the condition of greater cognitive unclarity. The second study assigned 30 groups of 5 girls each to 3 conditions which differed in degree of similarity among activities to be performed by the pupils; expectations were confirmed that comparison behavior is a function of task-similarity. The 3rd study explored comparison behavior among 10 boys' groups and 10 girls' groups and interpreted differences found in terms of differential confidence and competence. All 3 studies demonstrated the occurrence of large amounts of comparison behavior and suggest a pattern of association among this behavior and achievement-related behavior in elementary school children. (Author)

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Project No. 0B055
Grant No. OEG-2-700026 (509)

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THE EFFECTS OF INSTRUCTIONAL PRACTICES ON STUDENT LEARNING, EMOTIONAL GROWTH, AND INTERPERSONAL RELATIONS

July 1971

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Final Report

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THE EFFECTS OF INSTRUCTIONAL PRACTICES ON STUDENT LEARNING, EMOTIONAL GROWTH, AND INTERPERSONAL RELATIONS: Comparison Behaviors in the Classroom

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July 31, 1971

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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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National Center for Educational Research and Development

PREFACE

Acknowledgment is hereby made of the assistance obtained from the staff of the Lower Merion School District, including the District Superintendent, Superintendent of Instructional Services, Principals of each of the nine elementary schools, as well as individual classroom teachers. By their ready understanding of our experiemntal needs they indeed made these studies possible.

From the outset, this project was intended as the beginning of a research program which would not only contribute significantly to our understanding of the effects of social relationships on classroom learning, but would also serve as a useful training device for graduate students in the Department of Education and Child Development at Bryn Mawr College. It is, therefore, eminently fitting that the basic study of the relationship between task-similarity, comparison behaviors and achievement-related behaviors was executed in the context of a Ph.D. dissertation. The group task was conceived in a graduate research seminar, and given its final form by Dr. Hannah for use in her dissertation research. She also is to be given major credit for the final definition of the observation categories; the excellence of her observer-training is reflected to a large extent in the high intercorrelations obtained among the individual members of her team: Jane Crawford, Helen Slater, Patricia Tanabe, and Nancy Torop. To each, our thanks for their unique contributions. Mrs. Torop assisted in the execution of the third exploratory study as well.

The study of cognitive unclarity and comparison behavior provides valuable supportive evidence for our basic theoretical framework and was ably executed by Miss Jane Crawford as part of her M.A. dissertation. Miss Crawford's assistance with all three studies, including major responsibility for data analysis, is herewith gratefully recognized.

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INTRODUCTION

Perhaps the most basic fact about American education is that it has as its goal the education of vast numbers of children. It had to deal with masses of children in the past; it must deal with masses of children under present conditions of population growth, and it is most likely to have to deal with ever-increasing masses of children in the future as education becomes ever more of a necessity for all. Throughout the course of the history of education there has been periodic intense concern with mass-education as well, and the present American "crisis of numbers" in education finds its contemporary counterpart in every corner of the world. During the historic periods which emphasized education for the select few, an Alcuin or a Vittorino da Feltre could devise tutorial curricula that were exquisitely fitted for select individuals. But whenever and wherever educators had to deal with large masses of children, be it in Ancient Athens, Colet's London, Franklin's Philadelphia, or twentieth-century "underdeveloped countries", the solution has nearly always been a uniform classroom situation presided by a teacher who dispensed information which was to be absorbed and responded to in identical fashion by all. In the broadest sense it is the implication of this feature for childrens' classroom behavior and learning which is the area of interest to us here.

The effects of placing a number of children into a classroom, subjecting them to the same stimulus-patterns, expecting the same response-patterns from them, have not been investigated. We do not really know how the children react to each other under these conditions, and what the resulting impact on their learning may be.

Considering the plethora of group-oriented educational philosophies, juxtaposed with at least an equal number of educational psychologies emphasizing individual differences in ability and motivation, it would seem as if we were not really sure about the role of the children themselves in the educational process. In the several contemporary variants of Dewey-ite project methods involving increased pupil participation, for instance, learning benefits are said to stem from cooperative actions of pupils working toward a common goal. The clear assumption here is that children can, and should, learn from each other. On the other hand, self-directed instructional programs imply fostering of attitudes concerned with self-development, deliberately minimizing peer group influences or teacher evaluation. Here, then, the implication seems to be that children may have detrimental effects on each others' learning. Carried to the extreme, teaching machines may be the contemporary equivalent to Rousseau's antisocial tutor!

Today's preoccupation with various grouping methods, be it homogeneous vs. heterogeneous groupings of children, team-groupings of teachers, various track-systems, "open-classrooms", etc., may stem from the conflict between the necessity of having to teach simultaneously large numbers of children, and being more then ever conscious of their uniqueness, striving to elicit individual development as well. But perhaps such methodological concerns are premature when fundamental understandings are lacking of some basic features inherent in classroom situations and of their effect on children.

F.H. Allport, a pioneer in the field of social psychology, is one of the few scientists to have addressed himself to an aspect of this question (F.H. Allport, 1920). He initiated a type of laboratory study where children were asked to work alone and, at other times, together, on different kinds of intellectual tasks. His interpretation of their performance consisted in describing the "facilitative" and "distracting" effects of mere presence of other children on each others' intellectual performance. Today, with a considerable increase in knowledge of the dynamics of social influence processes, more trenchant conceptual analyses are possible.

The area of social psychological research and theory which we saw particularly applicable to our inquiry is that concerned with "social comparison processes". Our extension of the theory to childrens' behavior in the classroom constituted the basic framework for our research. It may be stated as follows: By the term "uniform instructional practices" we refer to daily lesson plans which include the teacher's presenting material to the class, requiring the children at periodic intervals to respond to identical questions, to answer identical tests, to carry out identical assignments in their seat, and, even when leaving the classroom situation at the end of day, to take with them identical homework. Specific hypotheses examined in the research to be detailed stem from the major assumption that the vast uniformity to which children are subjected in the classroom is a condition which leads children to compare themselves with each other. When a child is surrounded by other children all working on the same assignment, he will turn to those others for a variety of reasons - every teacher can attest to that. Our theoretical task thus consisted of specifying some of the conditions which elicit comparison behaviors and some of the effects of such behaviors.

But before our hypotheses could be put to experimental test, two major methodological developments had to be accomplished:

1. A standard situation had to be devised which would resemble conditions of uniform classroom practice and allow children to perform certain identical assignments;

2. Observation-categories had to be created to allow determination of each child's behavior while executing his assigned task. As comparison behavior had not previously been measured in children, categories for these behaviors in particular had to be defined both conceptually and operationally.

This report presents first a theoretical exposition of hypotheses about the nature of comparison behaviors, the conditions which create those behaviors in the classroom and about some of their interrelationships and effects on other social behaviors. It is followed by a methodological section which details developments in the two areas denoted above.

The main body of the report consists of a description of three basic experiments which employ the methods developed and test specific hypotheses derived from our theoretical framework. Additionally, our research gave some indication of the likely directions in which effects of social comparisons on own performance must be sought. Further, it allowed exploration of some of the individual pupil variables as related to comparison behavior. These areas will be briefly discussed, with special reference for future experimental work in this area. The report concludes with a discussion of implications for classroom teaching.

SOCIAL COMPARISON THEORY AND CLASSROOM BEHAVIOR

Social Psychology and Comparison Processes

In social psychological research concerned with "social comparison processes", a core theoretical assumption is that when the individual is uncertain about how to evaluate himself or part of the external world, he turns to relevant others to gain greater certainty (Latané, 1966). More specifically, when an individual is uncertain as to self-evaluation, and when "objective reality checks" are not available to a person for ability or opinion evaluation, he will use others to provide himself with a "social reality" (Festinger, 1950,1954).

Later reformulations have made further distinctions among the processes through which a person makes use of others. Kelley described one function of reference groups as a "comparison function" defined as:"...the behavior,attitudes, circumstances or other characteristics of members of the group represent standards or comparison points which...the person... uses in making judgments and evaluations" (Kelley, 1952, p.413). Thibaut and Strickland (1956) point to a similar comparison function in their concept of the person's "task set", which orients a person toward utilizing others as "...mediators of fact...in his attempts to achieve or maintain cognitive clarity about his environment" (p.116). Jones and Gerard, more recently, (1967), describe in their version of "comparative appraisal" four general classes of attributes "...in which another person's behavior can serve as point of reference for someone else: his beliefs, his attitudes, his abilities, and his emotions" (p.325).

Experimental studies of social comparisons have concentrated on social effects of comparison processes such as conformity, competitive coalition formation, persistence in level of aspiration, and so on. Thus, in experiments on conformity (e.g. Deutsch and Gerard, 1955) the subject is given knowledge of the specific position of others on a specified issue; how much this information influences him, i.e. causes him to agree with others, is taken as proof that social comparison has taken place. A study by Veroff of elementary school children infers comparison tendencies from their level of aspiration set in response to announced achievements of other school children (Veroff, 1969). The interest is in the social results of hypothesized comparison processes. The concept thus seems to have little to do with the actual comparison behavior per se;it refers to unspecified intervening processes said to result in social conformity. It appears that none of the studies has focused on the comparison behaviors themselves.

As a step toward denoting such behaviors, we assume that comparison must, presumably at an early point in the process, focus attention on the other: he must be looked at, listened to, asked for information. And, in order that the information sought can be utilized, it must be evaluated: appraisals must be made of the relative superiority of the other, of the correctness of his work, and so on. We thus assume that comparison processes consist of two modes of observable behavior: attentional acts and evaluational acts.

The classroom may be said to be a social field which provides all the above theoretically specified ingredients for the occurrence of social comparison behaviors: "cognitive unclarities" abound in pupils; evaluations of self and others are prominent; "relevant others" are provided. Each of these conditions is examined in somewhat more detail below.

The Classroom as a Reference Group

Classmates who are daily present, and who continue on with each other throughout the grades constitute a "reference group" which is relevant for most school-related comparisons. The class is made still more relevant by the commonalities created in almost all public schools by groupings based on age, homogeneity of ability, and, occasionally, of interest. Additionally, homogeneity of social background and familial experiences is created by way of childrens' residential propinquity.

Pupils become even more relevant to each other because of uniform instructional practices. The sheer size of the classroom necessitates such instructional uniformity in a given classroom for a good part of the day, regardless of recent knowledge about more effective classroom procedures. When pupils in one classroom are involved in the same learning activities, at the same time, each child is offered a ready-made source of reducing own uncertainties by reference to his neighbor's activities.

Interpupil comparisons do not necessarily occur under all classroom conditions. We would expect comparison tendencies to arise primarily under conditions where pupils are required to participate actively. Included here, then, would be the portions of class-periods taken up with recitation - pupils' public answers to the teacher's questions - as well as with those portions taken up with individual seat work. Typically, this involves the teacher's assignment of a number of problems to the whole class, with each student working on the same problem by himself.

The Classroom and Cognitive Unclarities

After all is said and done, learning still is the raison-d'etre of the classroom, and learning is concerned with the creation of cognitive differentiation and reorganization. As new instructional material is introduced, each student may be said to be 'cognitively uncertain". Of course, some will understand less than others. And so, whenever at a loss for an answer, or unsure of the correctness of answers, pupils will turn to each other to gain cognitive clarity.

Over and beyond this specific uncertainty about subject matter tasks, there are cognitive unclarities related to classroom mechanics. Pupils are often confused about what to do next, what page to turn to, what assignment is to be completed, and so forth. And thus, to the chagrin of many a teacher, children look to each other to reduce many sources of confusion.

The teacher may, deliberately or unwittingly, create restraints which prevent children from turning to him as a source of information. But even where the teacher makes himself available, and/or attempts to create standards against pupil interaction during classtime, he may meet with little success: the need is strong to turn to relevant others when cognitively uncertain.

The Classroom and Evaluation Processes

There is, in most classrooms, an evaluative atmosphere which permeates, explicitly or implicitly, almost every aspect of the pupils' lives (Jackson, 1968). The teacher's role requires that he act as chief and constant evaluator of the childrens' academic accomplishments as well as personal qualities. The children themselves may be observed to comment, often mercilessly, on most every feature of other childrens' appearance, including dress, lunches brought to school, as well as classwork, athletic prowess, and so on. Fairly early in the school year there emerges common agreement on who is "bright", and on who is "dumb", who is good in music and who is hopeless in shop.

Evaluative judgments are aided by a value-system according to which promotion and evaluation generally are based on relative standing (Pepitone, 1970). Own ability and accomplishment derives meaning, in fact, only in relation to that of others. Even a grade of "excellent" has quite different implications, depending on whether the pupil is the only one in the class with such a grade, or whether he is one of many. When tests are returned, the neighbor's grade would seem to be almost as important as one's own. Add to these the factor of parental concern with the school's evaluation of his child, and the

inference is inescapable that children will come to be concerned with evaluating their own abilities, performance, and classroom standing, as well as their classmates'. Some of the pupils' previously-mentioned interest in each others' work, then, is not merely a function of their cognitive unclarities, but of their need to evaluate the other's accomplishment, progress and so forth, prompted at least in part by self-evaluation needs which can be reduced by comparison with relevant others.

Comparison Behavior and Achievement-related Motives

We have isolated needs for cognitive clarity and for self-evaluation as factors in pupils' comparison behaviors. But these needs themselves may be instrumental to other motivations. That is, while, for instance, the need for cognitive clarity may be expressed in a pupil's asking questions, such behavior may also be a means of attracting the teacher's or parent's attention.

In a school setting, needs for cognitive clarity are likely to be in the service of a variety of so-called "achievement-related motives...which come into play when a person undertakes a task at which he will be evaluated, enters into competition with other persons, or otherwise strives to attain some standard of excellence" (Smith, 1969, p.1). Analogously, while the need for self-evaluation may be basic and an end in itself, and while evaluation of other pupils is elicited by the many factors we have enumerated before, both of these evaluation-needs have many different motive-bases as well. If the motive-base is a competitive one, for instance, evaluation of the other's progress or accomplishments must take place in order to arrive at a correct estimate of one's own position.

It appears then, that comparison behaviors are likely to be instigated by a variety of motives. Moreover, the very act of comparison can itself generate another motive. Thus, for example, what may start out merely as information-seeking behavior to satisfy a pupil's need to complete his assignment may set off the comparison act of inspecting the neighbor's work; evaluation of the latter may evoke a desire to do better than one's neighbor. Here, then, competitive motives have been called into play via mere visual comparison, prompted originally by "cognitive uncertainty", and, terminating perhaps, in a child's redoubled efforts to best his neighbor. Competitive motives are particularly likely to be evoked where evaluations of the other are involved, for in order to win over the other, relative positions of self and other must be established. It seems to be the case that any

act which would call attention to another child - be it via public teacher-evaluation of a pupil, a pupil's calling attention to himself or to another - may be a potential activator of comparison acts and of any number of school-related motives.

Our basic assumption, therefore, maintains that information-seeking, evaluative behaviors and achievement-related motives combine in a chain of complex interrelationships. Our research has attempted to make a beginning in understanding these interrelations.

The three studies reported in this paper are each based on observations of comparison behaviors and other achievement-related social behavior in elementary school children. The first two studies isolate two classroom characteristics which should, following the theory just outlined, elicit comparison behavior. In the first study, comparison behavior is investigated as a function of cognitive unclarity by varying the amount of information available to pupils who are working on task-assignments. The second study examines comparison behavior as a function of the degree of similarity of activities assigned to the children. The third study explores sex differences in comparison behaviors and introduces relevant variables of pupil confidence and competence. Additionally, all of the studies explore the complex circular interrelationships postulated to exist among attentional acts, evaluational acts and achievement-related motives.

METHODOLOGY

The Experimental Task

One of the gravest shortcomings in behavioral research - be it Small Group Dynamics in general or more particularly as applied to educational settings - is the lack of care devoted to the selection of experimental tasks. The resulting plethora of experimental tasks, most of them arbitrarily selected on the basis of convenience primarily, contributes largely to the paucity of research results which permit generalization to other related studies. Therefore, one of the highest priorities specified in this project was the development of an experimental task which could be used in a variety of projected studies of interpersonal behavior in elementary school classrooms.

1. Requirements

The needed task was to be characterized by the following features:

a. A group activity which could be subdivided into several separate activities to be carried out by individual pupils.

b. It should be possible for one pupil to complete the whole group task by himself, as well as for two or more children to participate simultaneously working on various subactivities.

c. It should be possible to create various degrees of interdependence among the separate activities, varying from complete independence (so that each child can carry out his task by himself) to interdependence such that each child could not complete his assignment without help from every other child.

d. It should be possible to vary the similarity of tasks by assigning identical activities to each child, as well as allowing each child to work on something entirely different from every other child.

e. It should be possible to vary the difficulty of the tasks so that they can be used with children throughout all elementary grades.

f. The tasks should bear some resemblence to schoolwork, but not require possession of special abilities, nor should children have previous experience with an identical activity.

g. The tasks should allow, during their performance, expression of any kind of social behavior; children should especially be afforded the opportunity to watch each other at work, to talk freely with each other should they wish to do so, or to remain silent, to help each other, to hinder each other, and so on. In view of theoretical issues envisaged to be dealt with in future investigations, it was particularly desirable that the task should be capable of execution when pupils either cooperate with each other or compete against each other.

h. The accomplishment of each child, as well as the goodness of the combined final product, should be measurable in quantitative terms.

2. Description

The task developed to meet the above specifications was as follows:

The task consists of a large circular "art puzzle", separable into pie-shaped parts. It is made of plasterboard, thirty-six inches in diameter. The puzzle pieces consist of pre-cut cardboard, variously colored, which, combined correctly, make an abstract flower design. The pieces are waxed on the back-side to allow for shifting around until final placement permits firm adherence by merely pressing the desired piece into place.

a. General procedure

To simulate the seat model, each of the children worked at her own desk on her own detached pie-shaped section in the studies carried out to date. It is equally possible to combine the pie-section and allow any number of children to cooperate in the task of placing relevant pieces into their proper position. The individual pie-shaped sections are combined upon completion to make a total design; this constitutes the group's product.

b. Level of difficulty

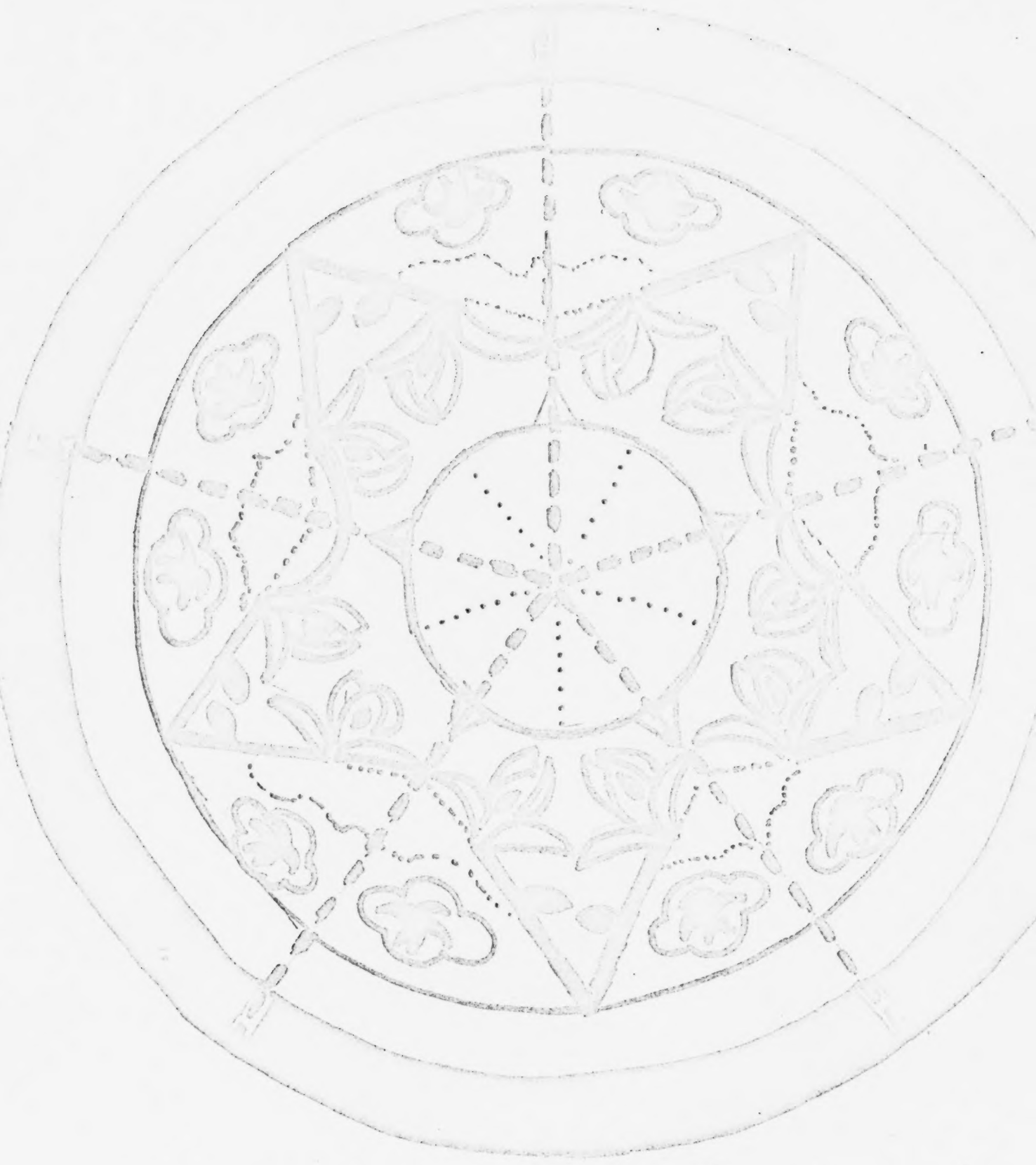
To date, the level of difficulty of the task has been adjusted for abilities of third-graders. By designing a simpler, or more complex pattern, respectively, it is possible in the future to adapt it to younger, or older, elementary school children.

c. Scoring

The group's product can be scored for speed and accuracy. Time taken to completion constitutes the measure of speed. A scoring key has been worked out which measures the deviation of the group's product from the model shown to each group during the instructional procedures. It permits calculation of both number and type of errors made. Scores for each individual pupil may be calculated from tracings of his own section. Each individual score, as well as the mean group score, can vary from zero, representing a totally incorrect product, to 14, which represents a completely error free, i.e. wholly correct reproduction of the model.

Illustration 1a shows the art puzzle with its five separable identical flower sections which was used in all three of the studies. Variation of the basic flower pattern may be seen in the Similar Condition (Illustration 1b) as well as in the Different Condition (Illustration 1c). These puzzle patterns were employed in the second study which investigated relationships between degree of similarity of task-assignment and comparison behaviors; their properties will be specified in the description of this particular study. Omission of color in this report necessarily lessens the full understanding of the art puzzle design and its colorful impact on the children.

Illustration 1a



Model for Identical Task Condition

Model = Completed Group Task

= Individual Task

Illustration 1B

Model for Similar Task Condition

Model = Completed Group Task

= Individual Task

Illustration 1a

Model for Different Task Condi

Model = Completed Group Ta

= Individual Task

The Observation Categories

1. Requirements

It was desirable to record each child's interaction with every other child in terms of who said what to whom, and to do so by preserving the pattern of initiation and response within a given time-sequence. Existing interaction systems were not adequate for our purposes, as none of them provided categories for observation of comparison behavior which were of central importance here. It followed from the theory presented that attentional behaviors and evaluational behaviors should be observed as well as a variety of social behaviors which could be said to be achievement-related.

2. Description

Observation included the two modes of comparison behavior and some of the presumably associated achievement-related social behaviors. Their salient definitions are presented next.

Comparison behaviors

1. Attentional acts

The childrens' task involved primarily perceptual and cognitive functions (deciding where pieces were to be placed, on the basis of previous inspection of model, and positioning them accordingly). Comparison behaviors thus had to engage the visual mode of attending to others. Distinctions were made between non-verbal and verbal attentional acts. Non-verbal attentional acts were defined operationally by the record of the child's looking activity. Distinctions were made among the referents (own task, others' task, the objective model) as well as among the functions (informational and/or evaluative). Verbal attentional acts included requests for help, for information, and expressions of difficulty.

2. Evaluational acts

Explicit evaluative verbalizations about the task are included in this category. Distinctions were made in the mode of evaluation: that is, evaluations could be positive, neutral, or negative. Further, the referent of evaluations was distinguished within each of these categories: own work, work of specific other persons in the group, and work of the total group, i.e. the group product.

Achievement-related social behaviors

1. Besting behaviors

These behaviors are indications of competitive motives. Operational measurements were based on expressive movements generally associated with such motives (e.g. assuming sprinting stance to be first to get needed materials; dashing back to seat, etc.), as well as on verbal statements from which it was possible to infer needs to excel over others. Comparative evaluational statements were included here (e.g. mine is better than yours), to be distinguished from the simpler task-evaluations described under 2 above.

2. Positive and negative social behaviors

In these categories were included social behaviors previously found to have relationships with competitive and cooperative social motives (Deutsch, 1949). Positive acts consisted of unsolicited offers to help, or correct others; also included here were positive responses to requests for assistance, to expressions of others' difficulties, and to assistance from others. Negative acts were the obverse: hindering others' progress; negative responses to requests for assistance, to expressions of others' difficulties, and to assistance offered from others.

Observer Reliability

Each of the five observers recorded behavior of two subjects so that reliability could be determined among overlapping observer pairs. Subjects were assigned to each observer according to a prearranged schedule in which pairs of observers watching the same two subjects were alternated systematically. By watching two children simultaneously, observers were trained to develop a constant rhythm as they looked back and forth during continuous recording of the two children.

Each unit within the categories was recorded by indicating the number of the child who initiated a particular act as well as the number of the child to whom the action was directed. Behavioral acts were entered consecutively so that the sequence in which behavior had occurred could be determined. Continuous behavior observations were employed from the point at which the group was given a signal to start, until the group had assembled the total work-pattern and completed post-work evaluations.

Pearson r's were computed between the amount of behavior recorded in each category by each of the two observers who made up a pair which observed the same two children. The correlations ranged from .70 to .97. The lowest correlations were obtained for the categories involving answers to requests, and answers to others' expressions of difficulty. In these categories, observer differences were due to differences in interpreting the child's behavior as self-initiated or as response to another child, respectively.

The different modes of comparison behavior were observed with reliabilities whose coefficients ranged from .87 to .97. Two comments are in order here. All the attentional categories hover around .90. Several sources of evidence have demonstrated the high degree of reliability with which eye-movements can be recorded (Exline, 1963). We may now add that more complex visual inspections may be observed equally reliably. Secondly, it should be noted that the combined evaluational acts of children were observed with near-complete observer agreement (coefficient for total evaluation was .97). But it must be recognized here that only verbal evaluations were recorded and that, in all likelihood, much evaluating took place that was not expressed overtly. Techniques must be refined to include these important non-verbal evaluations as well.

Intercorrelations Among Individual Behaviors in Attentional, Evaluational and Achievement-related Categories

For each of the subjects who participated in any of the three studies, the total amount of behavior in each of the observation categories was recorded and a correlation matrix computed for the forty-two categories. Since no major variations occurred within the pattern of the three studies, subjects from the three experiments were combined in the correlation matrix presented in Table 1. We present only the correlations of paramount interest, i.e. those concerned with behavior in Attentional, Evaluational and Achievement-related categories.

It is immediately apparent that practically all of the behavior categories appear unrelated. This is particularly striking in the case of all Attentional behaviors (category 1-5). As will be seen in the results from individual studies, attentional behavior occurred under all conditions, presumably serving a variety of functions, so that no consistent trend between attentional behavior and other behaviors is evident, including the postulated relationship with evaluative behavior. In order to determine such relations, individual attentional behaviors must be varied experimentally. We shall come back to these findings in the section on Implications for future research.

The internal consistency demonstrated by the correlations found between negative evaluations of others and positive self-evaluations (.48) perhaps justifies attention to be paid to intercorrelations among evaluative behaviors and boasting behaviors. The moderate positive correlations suggest relationships between positive self-evaluations and Boasting behavior, expressions of self-assurance and Boasting behavior, and negative evaluation of others and Boasting behavior. Here too, however, causal interpretation must await future experimental isolation of these variables.

TABLE 1

Intercorrelations Among Individual Behavior in Attentional, Evaluational and Achievement-related Categories

Behavior Categories	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Looks only at other													
2. Looks at other, places piece	.16												
3. Looks at other, changes piece	.21	.35											
4. Looks at own, places piece	.29	-.13	.02										
5. Looks at own, changes piece	.37	-.08	.03	.57									
6. Self-evaluation (+)	-.14	-.09	-.04	.03	.00								
7. Self-evaluation (0)	.00	.00	.02	-.04	-.03	.12							
8. Self-evaluation (-)	-.13	.00	-.05	-.09	.08	.18	.02						
9. Other evaluation (+)	-.20	.01	.00	.01	-.10	.45	-.03	.25					
10. Other evaluation (0)	.00	.09	-.10	.00	-.08	.12	.05	.09	.13				
11. Other evaluation (-)	-.20	.00	.00	-.08	-.12	.47	.17	.09	.40	.19			
12. Besting	-.18	.04	.02	-.10	-.14	.44	.15	.13	.25	.21	.48		
13. Time	.23	.20	.18	.11	.30	-.04	.00	.05	-.02	-.04	-.04	-.08	
14. Accuracy	.00	-.08	.00	.29	.04	.08	.08	.17	.19	.15	.08	.09	-.07

Procedural Commonalities

The three studies had several common features with respect both to population studied and general experimental procedures.

The sample of subjects was made up of predominantly middle and upper-middle class, white, suburban third-grade girls from nine elementary schools which comprise one suburban school district. Since analysis of variance showed no systematic differences in pupil behavior as a function of school or classroom treatment, data from all schools were combined.

Five children at a time were called out of one classroom to work together in a familiar room - library or music room - for approximately one class-period. Whenever comparisons were made between two or more conditions, one classroom was divided into several subgroups of five children which were randomly assigned to each of the conditions. Thus, comparisons could always be made within classrooms, so that "classroom climate", teacher-variables, and childrens' familiarity with each other were held constant. While these procedures involved a great deal of pre-planning and coordination with the school personnel, they were highly effective in allowing simulation of a school environment and at the same time giving maximum opportunity to create and control intended variables.

While instructions were being given, the children were shown a model of the finished design which was removed before the children started their work, thus presumably increasing their social dependence on each other. Each child worked on two flowers which made up the task with the design for her segment; upon completion all five sections were joined into the completed circle which represented the group's total product. Each child's final design was traced after the session and scored at a later date in terms of the type and number of errors made, as well as the amount of time to completion.

Subjects were seated at individual adjoining desks which formed a small circle. They were allowed to move about freely, to converse with each other, in short to interact with each other without any restriction in order to remove further the strong school standards about working independently so that comparison behaviors would be free to occur.

THE EXPERIMENTAL INVESTIGATIONS

Study 1: Social Comparison and Cognitive Uncertainty

To study the occurrence of comperison behaviors as a function of cognitive uncertainty, the availability of a physical standard of comparison was varied (Crewford, 1970).

Twelve groups of five third-grade girls each were assigned to two work-conditions. Instructions for all the groups included demonstration of a model of the completed design. In the Model Present condition, the model was allowed to remain in sight of the children during their entire work-period. It was placed in the center of the circle, equidistant from each of the five children, at a level slightly below their desk tops, thus requiring an easily-discernable downward head movement. In this condition, then, the model can be said to have constituted "physical reality" in that it provided a constant source of reliable information about how the pieces should be placed, as well as being a constant standard against which one's performance could be evaluated. By contrast, in the Model Absent condition, the model was removed before the children started their work. Relative to the Model Present condition, the children had to rely primarily on their own memory, visual imagery, skill, and on each other.

In order to create conditions which would give Ss maximum opportunity for profiting from each other's knowledge, each of the five children in each group in both conditions worked on identical tasks. According to the theory outlined previously, more need for social comparison behavior existed in the Identical task, Model Absent condition (IMA condition), as compared with the Identical task, Model Present condition (IMP condition). Table 2 summarizes the major behavioral findings.

To be noted first is that well over one third of all interactions were spent in non-verbal inspection in both conditions. There is a highly significant difference in the attentional referent in each of the two conditions: where no physical standard is present (IMA condition) children look to each other; where a physical modal is provided, it serves as the major source of reference.

Presence of a physical standard not only decreases attention paid to others, it also diminishes reliance on own abilities: as compared with work in the IMA condition, there is significantly less independent work in the IMP condition. In other words, in the latter condition more than half of all the

TABLE 2

Mean Number and Percentage of Comparison Behaviors and Achievement-related Behaviors When Physical Model is Absent and Present

	Mean (MA)	%	Mean (MP)	%	t-value
Independent Work	108.83	32.7	46.83	14.7	3.16**
Attentional Acts, Total	127.03	38.6	151.33	54.3	n.s.
Nonverbal, Total	120.33	36.7	146.66	52.6	n.s.
Inspects other, no work	86.33	26.7	42.83	13.2	2.25*
Inspects other, works	34.00	10.0	12.67	4.8	4.16***
Inspects model, works	—	—	91.16	34.6	—
Verbal, Total requests for information, help	6.17	1.9	4.67	1.7	n.s.
Evaluational Acts, Total	24.48	6.9	9.16	3.4	2.03
Self-Evaluations	7.49	2.2	3.33	1.2	1.67
Positive	2.83	.9	.67	.2	1.58
Neutral	1.50	.4	.16	.1	2.02
Negative	3.16	.9	2.50	.9	n.s.
Evaluation of Others	16.99	4.7	5.83	2.2	1.96
Positive	3.49	1.0	1.67	.6	1.86
Neutral	.50	.2	.50	.2	n.s.
Negative	13.00	3.5	3.66	1.4	1.64
Achievement-related Social Acts					
Besting	14.18	4.0	2.66	.9	2.79*
Negative social acts, total	6.01	1.9	2.17	.8	3.56**
Positive social acts, total	33.34	9.5	28.01	10.6	n.s.

* $p < .05$
** $p << .01$
*** $p << .005$

N = 6 groups in each condition

nonverbal attentional acts consist of alternations between looking at the model and working on one's task. Thus the function of the referent seems unambiguous: the model is used to obtain information; in its absence, Ss depend on each other for information (Inspects other, works, 10% vs. 4.8% respectively).

One final result is to be noted in the category of attentional behaviors: in both conditions, Ss engage almost as much in sheer looking at each other as they do working independently (Category Inspects other, no work). This is a finding encountered in each of the subsequent studies; it strengthens the inference that evidently children look to each other for additional reasons than merely to obtain information about the task-at-hand. In the IMP condition, children could completely ignore each other for purposes of information-seeking, since complete information is provided; yet 18% of their interactions are devoted to inspection of others.

As compared with attentional behavior, there is a much smaller percentage of evaluational acts in both conditions, but what there is, is found significantly more in almost every evaluational category of the IMA condition. This holds, whether the referent is the self, or others in the group. Apparently, attending to others stimulates evaluational activity. No correlation is found between these two variables, presumably because attentional activity is followed by many different kinds of behavior as well, increasing its variability. The relationship show up inferentially by examination of other variables.

A significantly greater amount of Besting Behavior is found in the IMA condition. A Pearson r of .55 is found between the latter behavior and evaluational activity.

Examination of various positive and negative social behaviors throws light on the childrens' motivations. As might be expected, there is relatively little overt negative behavior but, as was the case with evaluational behavior, what there is, is found significantly more in the IMA condition. Presumably, others are seen as competitive rivals and reacted to with hostility. This hostility takes the form of techniques such as refusal of help when it is asked for: the correlation between inspecting others' work and offering information or help is negative in the IMA condition (-.41). Low negative relationships are also found between helping acts and doing independent work. In other words, comparison behavior not only elicits achievement motives, but carries with it actual refusals to cooperate.

In the IKP condition children aid each other more freely. While there is no overall difference between the two conditions with respect to total positive social behaviors, when helping and correcting behaviors are combined, their mean is substantially greater in the IKP condition (7.00 vs. 14.34, respectively). This difference may be more important considering that in the IKP condition Ss have been shown to be concerned more with the model than with each other. But when they do pay attention to each other, their achievement needs presumably do not prevent them from helping each other: as might be expected, correlations between inspecting others' work and offering information, or correcting others, are positive (Offers information vs. Inspects others and works .35; independent work and offering information .25).

We have attributed occurrence of comparison behaviors in this study primarily to the childrens' opportunity for using each other as a source of information. This was made possible by work on identical tasks. If this is so, then keeping the same low degree of physical reality in the sense of reproducing the model absent condition, but reducing the similarity among the activities of the five children, should also lower the amount of comparsion behavior. This is the object of the next experiment to be summarized.

Study 2: Social Comparison and Similarity of Activity

In this experiment, the similarity of work assigned to each of the children in a group was varied systematically in three conditions. Each condition used a different model; each of the models differed in the extent to which its five parts - the child's task - resembled each other:

In the Identical Condition (I) each of the five children in a group were putting together exactly the same flower-pair to make a completed circle of five pairs of identical abstract flowers. A black and white version of this art-puzzle is included in Illustration 1a. This condition was the same as the IMA condition of the previous study. Understanding how to put one flower-pair together enabled one fully to understand how to complete any one of the other flower-pairs.

In the Similar Condition (S) each child's task involved the making of a different flower-pair, though several comparison points existed among each of the individual tasks (e.g. general placement of stems, leaves, other extraneous parts). (See Illustration 1b for the Similar Version of the art-puzzle). Understanding how to put one flower-pair together enabled one somewhat to understand how to complete any one of the other flower-pairs.

In the Different Condition (D) the same pieces were used as those of the S condition, but were combined very differently to make five different pairs of abstract "animals". (See Illustration 1c for the Different Version of the art-puzzle). Understanding how to put one animal pair together would not enable one to understand how to complete any one of the other animal pairs.

Each of the tasks within a condition, as well as between the three conditions, was equated for difficulty. In all three conditions, the model was absent during the work-period, so that children were made maximally information-dependent on each other.

150 Ss were studied; ten groups of five third-graders were assigned to each of the three conditions. A one-way analysis of variance was carried out for each of the behavior categories.

Hannah's major findings, summarized in Table 3, support and complement the Crawford data. The trend in the body of the data varies as predicted with degree of similarity, with highly significant differences predominantly between the extreme conditions. While differences in amount of independent work do not reach statistical significance, the trend is in

TABLE 3

Mean Number of Comparison Behaviors and Achievement-related Behaviors Under Three Degrees of Similarity of Task

	Mean (I)	Mean (S)	Mean (D)	F(2/30) ISD	t-values(n=10)[a] I-S	I-D	S-D
Independent Work	103.6	113.9	117.0	0.53	n.s.	n.s.	n.s.
Attentional Acts, Total	120.7	83.7	84.7	3.04+	2.51*	2.67**	n.s.
Inspects other, no work	82.9.	66.8	70.6	0.70	n.s.	n.s.	n.s.
Inspects other, works	21.0	9.0	5.5	15.06***	3.48***	4.91***	n.s.
Group Evaluational Acts, Total	5.9	2.5	2.3	6.84**	2.77**	3.01***	n.s.
Self-Evaluations							
Positive	2.9	1.3	2.9	0.96	n.s.	n.s.	n.s.
Negative	5.0	5.0	9.7	1.66	n.s.	n.s.	n.s.
Negative evaluation of own product	0.4	1.3	1.7	4.87*	-2.42*	-3.24***	n.s.
Positive evaluation of own product	2.4	1.6	1.3	2.24	n.s.	2.03*	n.s.
Achievement-related Social Acts							
Besting	11.8	3.2	3.3	8.83**	3.29***	2.99***	n.s.
Negative social acts, total	28.9	11.4	18.1	2.76	2.74**	n.s.	n.s.
Positive social acts, total	27.0	29.9	39.0	0.64	n.s.	n.s.	n.s.

+ $p < .10$
* $p < .05$
** $p < .01$
*** $p < .005$

a t-values were calculated after applying Bartlett's test for homogeneity of variance.

N = 10 groups in each condition

the predicted direction: the greater the similarity among tasks, the less independent work tends to occur, and, unambiguously, the more attention is paid to others while working. Significantly more total evaluations of the group are made in condition I. In the latter condition we find again the pattern of achievement-related social acts discussed in the previous study: large amounts of boasting behaviors, large amounts of negative social behaviors, and, relative to the other two conditions, less total positive social acts.

Although differences between conditions S and D are generally in the expected direction, none of them reach significance. Perhaps the differences are not as strong as we would expect because there are still common features among the diverse tasks in the D condition (use of pre-cut materials which must be arranged into a pattern, even though the pattern itself is non-comparable from neighbor to neighbor). Presumably, assignment of entirely different activities to each group member would further reduce comparison behavior, as predicted.

Additionally, however, a unique pattern of negativity in evaluation, though not in social acts, emerges in D. Although not significant, compared with the other conditions, almost twice as many negative self evaluations are made during the work-period. This trend is confirmed by a second evaluative measure called for at the close of the session. Ss were asked to assign a numerical grade to each of the completed tasks, and again children in D downgrade their own work. No differences in evaluation of others were found. One might speculate whether relative lack of opportunity for social comparison found under conditions of different work-assignments creates uncertainty about own abilities. Perhaps, this is in the nature of solitary work: total absence of a reference group which would constitute "social reality" does not permit self-evaluation, which may create self-doubts and anticipation of failure.

The great deal of visual attention paid to others even while not working (Category Inspects other, no work) - which we have noted in the Crawford data and again encounter in all three conditions of the Hannah data - might be considered an attempt to gain such reassurance about the goodness of own performance relative to others. Where such comparisons cannot be made (in D) we would expect low confidence, self-doubts, fear of failure, etc.

This interpretation suggests that confidence in own abilities must be seen both as a determinant of social comparison behavior, as well as being affected by the outcomes of comparisons that were made. These complex interrelationships were explored in a study of sex differences in comparison behavior.

Study 3: Confidence, Competence, Achievement-related Motives and Social Comparison

There is evidence that girls have consistently lower expectancies for success in intellectual and scholastic activities than do boys (Horner, 1968; Crandall, 1969). If our sample of girls were found to display less confidence in their own abilities than boys, they should engage in more social comparison behaviors directed toward gaining reassurance from others. Whether girls would also seek from each other information about their work would be a function both of their level of confidence, and their actual competence in the task. There were no a priori reasons for assuming that boys and girls differ in actual performance on our task. On Iows tests that had been administered previously to third-graders, the girls used in our study received significantly higher scores than the boys on both reading and verbal ability.

Ten boys' groups were matched with ten girls' groups from the same classrooms and all were assigned to the I condition, it being the condition in which most comparison behaviors had been shown. Concern over the possible "feminine" bias of the task proved unfounded; postwork interviews showed no differences in liking of the task, etc., among the boys as compared with the girls.

Table 4 presents cross-sex comparisons of interaction behaviors under Identical task-conditions. The data form a highly consistent pattern: on the average, boys express almost three times as much assurance about their abilities as do the girls. And boys do, in fact, take significantly less time to complete their assignments than do the girls; error-wise, the boys' performance approaches the 0.6 level of significance in favor of boys.

The girls, as predicted, engage in significantly more comparison behaviors of both the attentional type and in evaluating the group as a whole. The difference is striking in the "pure attention category" of "Inspects other, no work" (Mean girls 82.9 vs. mean boys 32.4), which we were led to assume in Study 2 reflected in part attempts at gaining reassurance. Attentional behavior whose function has been said to be primarily informational (Inspects other, then works) is also significantly more frequent in the girls' groups.

There is no way of deciding whether the task was actually easier for the boys, or whether they had greater confidence in their ability to begin with. In either case there would be less need for comparison behaviors and this would free the boys to attend to their assignments more efficiently, i.e. more rapidly, as indeed they did. Not only were they free to tend

TABLE 4

Comparison of Girls' and Boys' Interactions and Performance Under Identical Task Conditions

Category	Mean (Girls)	Mean (Boys)	t-value
Expression of assurance	2.6	6.3	2.07*
Time to completion, minutes	20.0	14.0	3.62***
Accuracy	7.0	8.0	1.52+
Attentional Acts			
Inspects other, no work	82.9	32.4	3.86***
Inspects other, works	21.0	9.8	3.01***
Evaluational Acts			
Positive evaluation of group	2.3	0.6	2.93**
Negative evaluation of group	5.2	2.9	2.12*
Achievement-related Social Acts			
Neutral answers to requests	.0	9.0	2.26*
Offers of information	9.2	16.8	3.66***
Besting, overall	11.4	11.8	n.s.
Besting, Part II	.08	.56	2.25*
Besting, postwork	.9	.5	n.s.

+ $p < .10$
* $p < .05$
** $p < .01$
*** $p < .005$

N = 10 groups in each condition

to their task, but they were free to share their knowledge with each other, as may be seen by the significantly greater average amount of both neutral answers to requests, and offers of information, as compared with the girls.

No differences in either positive or negative achievement-related social acts were found, nor does overall besting behavior differ between boys and girls. Yet, at certain key-points during the work-period, boys betrayed by their expressive, non-verbal acts symptoms of competitive motivation. For instance, many boys assumed a sprinter's stance waiting to dash off to the table for work material to begin work in the second part of the work-period. When this brief time-period is analyzed, boys show significantly more besting behaviors of this type than do girls.

Why, then, did the boys' competitive motives not lead to an increase in comparison behaviors, as was found in the other studies? The answer must be sought in their greater competence and/or confidence. That is, boys, being both competent and confident, did not need to engage in evaluations of their own abilities, and, to the extent that they were competitive, they did not want to lose time attending to each other to ascertain each other's position. The girls, being less confident, have greater need to engage in comparison behaviors, and that these acts eventuate in evaluation and besting, as found previously, can be demonstrated here too. When the girls combine their individual products at the end of the work-period, there is a strong tendency to evaluate and best each other more than do the boys during this brief time.

We are lead to several hypotheses about the pattern of these interrelationships. The occurrence of comparison behavior is a function of a person's level of competence, his confidence in his abilities, and his achievement-related motives. Where all of these factors are extremely low - for instance, in some ghetto children with low school-related abilities, very low self-confidence, and little achievement-motivation - we would expect very little comparison behavior. But we would also expect relatively little comparison behavior on the other extreme: the highly able, highly confident, highly motivated child will have little need for social comparison. It is the children in the intermediate range of each of these variables - the children who constitute the vast majority of public school children - who will show the greatest amount of comparison behavior. For it is these children who will need to rely on each other for information when they do not understand, who will doubt their own abilities and who will need reassurance from each other, on whom parental and other social pressures to achieve are great, so that they perceive classmates as potential rivals to be watched in order to outdistance them. It is the same children who will need to compare themselves with each other to gain, eventually, a realistic estimate of their own abilities.

Our research was designed to determine some of the arousal conditions of comparison behavior and to examine some of the hypothesized interrelationships among the different types of comparison-acts and achievement-related behaviors. The educator's interest, of course, lies primarily in determination of the effects of these behaviors on the pupils' performance. We assumed that these effects were likely to be many, varied, and complexly interrelated and that we would have to await studies designed specifically to determine effects on performance. Since, however, performance-measures were obtained in the three studies, they are briefly summarized below primarily to serve as guides for future investigation.

Reference to Table 1 shows that, when subjects from all three studies are combined, there is complete absence of correlation between the two measures of performance - time and accuracy - as well as between each of the measures of any one behavior category. The separate studies tell a different story.

In Study 1, the Model Present Condition - in which Ss, while working on their tasks, had at hand complete information about how each piece should be placed - showed performance significantly better on both criteria as compared with the Model Absent Condition. Complete accuracy is represented by a score of 14 points; the means for the IMA vs. IMP conditions are 7.2 and 13.8, respectively ($t = 12.96$, significant at the .001 level). In terms of time taken to completion the same results were obtained: the mean number of minutes for the IMA condition was 21.8 whereas that for the IMP condition was 12.5 ($t = 5.36$, significant at the .001 level).

This result might best be taken as validation of the performance score, as it shows that it is responsive to the amount of information available about how to execute the task. When complete information is available, performance is efficient and near-perfect. Secondly, we obtain a suggestion from Study 1 that comparison behavior does not necessarily aid performance (as comparison behavior in the IMA condition is greater than in the IMP condition, yet performance in the former condition is poorer as compared with the latter). Study 2 gives further support to this assumption.

Study 2, in which systematic differences in comparison behavior had been obtained as a function of task-similarity, shows no differences in performance among the three conditions. (Mean accuracy is as follows: I = 7.20; S = 7.38; D = 7.62). The closeness of the three performance means is remarkable, considering that they are found in three very different work

conditions. They certainly point to the conclusion that comparison behavior per se bears no relation to performance.

One other set of data sheds some light on this assertion. A "uniformity index" was calculated, which represents the mean number of points which four out of five members of each group had in common. Thus, the size of the score can be said to represent the degree of similarity of performance among members of a group. The scores are 6.1, 4.0 and 4.9 for the I, S and D conditions, respectively. The difference between the I and S conditions is significant at the ten percent level. In other words, under identical task-conditions, increased comparison behavior is found, especially of the attentional variety, and it, in turn, makes for greater uniformity in performance, though not necessarily for correctness. For without expert guidance, pupils are as likely to pick up from each other errors, as they are likely to pick up correct solutions. If this reasoning is correct, we would hypothesize that goodness of performance does not depend on comparison behavior per se, but rather on such factors as the competence of those performing the tasks.

This hypothesis has been shown to receive confirmation in the third study, in which boys were found to produce significantly better and more accurate work than did the girls under the same conditions (see Table 4). An analysis was offered of the relationship between comparison behaviors, achievement-related motives, a person's level of competence, level of confidence, and performance.

It is relevant here to realize that performance is additionally a function of achievement-related motives, especially in the performance of school children. It cannot at all be assumed that this relation is direct and positive; high achievement motivation may be accompanied by large fear of failure, tension, etc., which work against goodness of performance. Additionally there is the hypothesized interrelationship with attentional and evaluational behaviors, and again these are not likely to be simple predictors of performance. As asserted previously, it is highly likely that a pupil who is motivated to compete with another will pay attention to him in some form, and at some time, but the effects on performance are likely to be a function of the amount of distraction represented by such comparison behavior, the pupil's ability to utilize information gained via comparison, and the like. In Study 1, significantly more besting behavior was found in the IMA condition and performance was significantly poorer in this condition as compared with the IMP condition. In Study 2, significantly more besting behavior was found in the Identical condition, yet performance did not differ as compared with the other two conditions who showed relatively less besting behavior. In Study 3, boys could be inferred to be significantly more competitive than girls at certain points in their work, and their performance was significantly better than that of the girls. The need for further research is self-evident.

BESTING BEHAVIOR AND FAMILY VARIABLES

In the Methodology section which dealt with observation categories the absence of correlations was discussed between attentional behaviors and other interactions. Reasons were sought in the variety of functions served by attentional behavior. Further, the effect of our experimental conditions was so strong as to mask any individual differences in personal orientation toward others. The greatest pupil variability was found in the category of besting behavior. Since relationships between the latter behavior and evaluation have been demonstrated, and since besting acts have been assumed to represent achievement-related motivations, besting behavior was selected for exploratory cross-analysis. It was likely both from indications in the literature and on a priori grounds that relations between competitive motives and familial background variables might be found. The analyses presented below represent explorations of these relationships.

Two kinds of data were obtained from each child's school records: teacher evaluations and objective records about the child's family structure.

The teachers' written comments about each pupil were scored by two independent analysts for amount of interest and involvement in learning. A second score was obtained in a similar manner reflecting the quality of the child's social relationship with his or her peers. Some comments did not allow scoring; wherever possible, each child was assigned a score of High, Average, or Low, respectively. Neither of the two ratings showed any relationship to besting behavior. At this stage, interpretations would be purely speculative and are not pursued further here.

Among the familial variables, interestingly, different relationships with besting were obtained for girls than held for boys:

Degree of mother's education was found to bear no relationship to besting for either a boy or girl; neither did the father's education for girls.

For boys a significant trend was obtained: boys whose fathers had not finished high school showed least besting; those with education beyond college had the highest amount of besting, while boys whose fathers' education stopped with completion of college fell in between (Respective means are: 1.17, 2.11 and 2.94; difference is significant at the .05 level).

A systematic trend showed [illegible] both for boys and girls consistently, though it missed reaching significance: the largest amount of besting was found in the small family (either only child or one other sibling); least besting was found in the large family (four or more children).

The last significant trend is seen in the variable pertaining to position in family: for boys, the youngest child is more competitive than either only or oldest children, while "only" girls are found twice as competitive as the oldest. (Boys: Only son 2.33, Oldest 2.11, Youngest 3.60; Girls: Only 4.50, Oldest 1.75, Youngest 1.58).

We may summarize the data as follows:

"Only" girls showed most achievement-related acts under our experimental conditions.

The greatest amount of besting behavior was found among boys who had highly educated fathers, and only one sibling, most often an older one.

It is noteworthy that the pattern of small-family-size and highly educated father is characteristic of a higher socio-economic level. Making this assumption, our data would seem to be in agreement with assertions about more intense achievement needs found in middle-class boys as compared with those of lower socio-economic standing. It would be of considerable interest to determine in the future whether this finding holds for comparison behavior as well.

RECOMMENDATIONS

Implications for Research

1. Studies 1 and 2 created conditions postulated to elicit comparison behavior. This indeed proved to be the case; large amounts of both attentional acts as well as evaluational acts were recorded. Further, in these conditions the hypothesized largest amount of besting behavior was found. In order to make progress in determining exact interrelationships between these three types of behavior, different types of comparison behavior need to be isolated experimentally in relation to specific functions they are hypothesized to fulfill. Thus, for instance, attentional acts should be evoked under conditions where B's behavior is essential for mastery by A of a problem, and under conditions where B's behavior is necessary for A's evaluation of his own relative standing, etc. Similarly, various types of evaluations of A by B should be manipulated independently in order to determine precise effects on A's self-evaluation and achievement-related behaviors. It is in this direction that understandings would seem to lie of the complex interrelationships between comparison behavior and achievement-related motives and acts.

2. The sample of subjects was drawn primarily from the middle- and upper-middle class. This may be the familial background which is most likely to foster in the school child concern with social comparison as well as with achievement. Our cross-analyses with family-background factors lend some support to this assertion. The studies should therefore be extended to include the lower socio-economic range. Generalizing from results of Study 3 which investigated comparison behavior as a function of sex differences, no overall differences in comparison behavior should be expected as a function of socio-economic background per se. Rather, the important mediating variables may be, as hypothesized, pupil competence and pupil confidence, which, in turn, may be class-related.

3. Finally, the discussion of classroom implications which follows points to urgent demands for research which would determine the desirability of different kinds of peer group comparison at different stages of pupils' emotional and cognitive development.

Implications for Teaching

Perhaps the most important finding in each of our studies is the ubiquity of social comparison behavior among third-graders. Yet, while they were extremely "tuned-in" to each others' performance, they did so in a furtive, obviously guilty fashion. And indeed, most classrooms have extremely strong standards against manifestations of childrens' interest in each others' work. This was brought to our attention time and again when a child, upon catching another's glance toward her work, responded with an angry "don't copy". Others attempted to cover up their work. And the comparison-seekers, in turn, had developed that skill to a fine surreptitious art so that stealthy glances were cast at others without betraying themselves with as much as the slightest muscle-movement. In the childrens' attitudes, in the tone of their voice, one began to sense the teacher's constant admonition of "eyes on your paper" - "don't copy" - "work independently" - "never mind what Susie is doing".

What are the implications of our studies for the handling of comparison behavior in the classroom?

1. If future studies support the pattern pointing to circular, mutually reinforcing chains between different types of comparison behaviors and achievement-related behaviors, then indeed any classroom procedure that fosters one aspect of comparison behavior will foster another as well, whether that is intended or not.

We wish to point out here, in particular, likely interrelationships between competition in the classroom and pupil preoccupation with each others' performance as follows: the vast majority of schools utilizes a competitive test-score climate as a major force for intellectual accomplishments, with awards that are, by definition, scarce. Teachers, some deliberately, (e.g. they see themselves as preparing children to function in a real, competitive world), some unknowingly (by employing specific formal teaching techniques which pit one child against another such as "marking on the curve", "honor rolls", "position in class"; by using social comparisons themselves in their informal references to performance of one pupil as compared with another) encourage the development of achievement-related motives in children. But, ironically, while the teacher may be intent on stimulating in her pupils needs and goals of intellectual achievement by use of such techniques, she may be succeeding only in heightening their competitive motives and creating conditions where attention to others' performance becomes more important than own understandings.

2. In the discussion of Study 1, emphasis was placed mostly on social influence processes which occur in the absence of "physical reality". The presence of the latter was represented by the Model Present condition. This condition simulates in its essential features frequently used elementary classroom techniques which rely primarily on copying from a standard model as, for instance, is found when numbers, letters or drawings are copied from the blackboard or workbooks. It should be noted that, indeed, in this condition, much less social interaction, including comparison with others, does take place (although such comparison is by no means absent). The pupils, having been told the requirements and having, additionally, access to the model whenever they find it necessary, fully understand the demands of the task and are occupied with its execution. For many learnings, perhaps especially those involving acquisition of manual skills, this may be a highly satisfactory procedure. It should also be recalled, however, that in this condition, individual deviation from the model was practically non-existent; this finding lends strong support, if such be still needed today, to the assertion that copying from a model is anathema to expression of individual creativity in young children.

3. Comparison behavior is a potent force to be dealt with in the classroom; ignoring or actively repressing it does not do away with it.

4. Our basic position is that comparison behaviors per se are neither "good",nor "bad", but that they have the potential for being constructive or destructive agents in the pupils' personal growth and cognitive development. Let us elaborate on these two aspects of the school child's development in relation to comparison behavior.

5. We have discussed data of relevance to the child's emotional development: we have indication of the child's low self-confidence if not permitted to make comparisons with his peers' performance. Veroff has recently asserted that comparison, especially during the first three years of elementary school, enables the child to reach "mature mastery" over his comparison behavior; further, that such behavior enables the child to reach a correct self-definition that "makes him feel like an adequate person in relation to others who are significant to him" (Veroff, 1969). We would agree, with the important qualification that it would seem to depend on the outcome of such social comparison.

That is: does the teacher's comparison of a first-grader who cannot do simple addition with another pupil who can perform this complex feat, help the child to achieve a "realistic definition of self" (which here, we would presume,

might mean to recognize his limitations as a future mathematical genius)? What of feedback of the high school student's aptitudes that are compared with class-norms, school-norms, national norms, etc.? What would seem to be important to know, then, is at what stage of development, what kind of social comparison is devastating, and what kind is a positive agent in contributing to the child's personal growth. In the absence of research answers, it would seem that the teacher must simply be aware of the manifold consequences of social comparison and provide the child with comparison that will be beneficial to him.

6. Much the same arguments as the above are relevant to comparison behaviors in relation to the child's cognitive development. We have found no relationship between a child's comparison behavior and his performance, for the reason that no simple relationship between these two complex variables is likely to exist. If left uncontrolled, the effects of a pupil's examination of his neighbor's work will be a chance-matter: the information he obtains from another child may help him to finish his problem correctly. But it may also be totally worthless, or misleading; it may lead him to pre-occupation with the other's performance to the detriment of his own, and so forth. It would seem that teachers must be alert to the possibility of helping children to utilize learnings that may be obtained from comparison with others. Before going into this point in greater detail, we must take up the frequent teacher objections to allowing open comparison with others in the light of the need for independence training.

7. Teachers often seem to want to counteract uniform classroom practice by insisting that each child work "independently", meaning that he remain in his seat working as if armed with blinders that would shut out the rest of his peers, even though they are working on the very same problems. Findings from Study 2 should be recalled which show that under identical task conditions children will look to each other for answers, and will compare their work with each other. If "independent work" is desired, let the pupils not work on identical tasks!

Teachers frequently support their demand for independent work with the argument that pupils must develop skills of being able to solve problems by themselves. Of course this is true, but again it is a question of what kinds of learnings are better acquired independently, and which are better acquired in a social exchange-setting. Again, research must provide the answers. From the point of view of cognitive development, what are the reasons for demanding that multiplication skills be acquired in solitary seat-work? Traditionally, it has been assumed that tasks involving individual

"creative talent" - writing compositions, art-work, etc. - are better pursued in a solitary fashion. Group "brainstorming" results cast some doubt on this assumption, as do data from Study 2 which show greater insecurity while working on a task which differs from that of one's neighbor. It is not known to what extent, and at what point in the process, solitary work is a necessary ingredient of creative work. Nor is it known at what point in a child's development independent work of the kind demanded in traditional elementary classrooms is of developmental value. Children certainly seem to derive emotional security from some kind of social comparison. Results from Study 2 imply that instructional practice should avoid the Scylla of exclusive use of identical task-assignments with its consequent competition and hostility, but also the Charybdis of wholly individualized work with its accompanying insecurities. Were we given the opportunity to deviate from uniform instructional practice, we would opt for classroom instruction which incorporates individualized, yet complementary and meaningfully related pupil activities such as can be developed in projects involving the whole class.

8. However, returning to the raison-d'etre for our research which assumes that demands made by mass-education will continue to require uniform instructional classroom practices, we suggest that the powerful consciousness of peers which we have demonstrated be put to positive use, rather than repressed.

Instead of classroom standards against sharing information with a fellow pupil (which are disregarded to a surprising degree), classroom standards toward helping each other should be created. That is, as long as mass-education means identical classroom instruction, pupils ought to be allowed to help each other while wrestling with the same intellectual problems. There is, currently, some experimenting with peer-teaching and cross-age teaching (e.g. Lippitt and Lippitt, 1968); we would widen these experimental procedures to become standard practice in every elementary classroom. But to reduce the chance-effects on learning and emotional development which come from uncontrolled social comparison behavior, we suggest further that pupils must be shown how to profit from the results of interaction with their neighbors (Pepitone, 1971). Ways must be devised of teaching children how best to learn from each other, instead of teaching them ways that lead to learnings aimed at besting each other.

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